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$$\text{But } e^{-i[x^2 \sin 2\theta + (a^2 + 2x^2) \cos \theta]} = \cos [x^2 \sin 2\theta + (a^2 + 2x^2) \cos 2\theta] \\ - i \sin [x^2 \sin 2\theta + (a^2 + 2x^2) \cos 2\theta], \text{ and}$$

$$e^{-ia} = \cos a - i \sin a. \quad \text{Hence}$$

$$\int_{-\infty}^{+\infty} e^{-[x^2 \cos 2\theta + (a^2 + 2x^2) \sin 2\theta]} \left\{ \cos \left(x^2 \sin 2\theta + \frac{a^2}{2x^2} \cos 2\theta \right) \right. \\ \left. - i \sin \left(x^2 \sin 2\theta + \frac{a^2}{2x^2} \cos 2\theta \right) \right\} dx = \sqrt{\pi} e^{-a} [(\cos \theta \cos a - \sin \theta \sin a) - \\ i(\cos \theta \sin a + \sin \theta \cos a)]. \text{ Separating the possible and impos. p'ts we have}$$

$$\int_{-\infty}^{+\infty} e^{-[x^2 \cos 2\theta + (a^2 + 2x^2) \sin 2\theta]} \cos \left(x^2 \sin 2\theta + \frac{a^2}{2x^2} \cos 2\theta \right) dx \\ = \pi^{1/2} e^{-a} \cos(\theta + a),$$

$$\int_{-\infty}^{+\infty} e^{-[x^2 \cos 2\theta + (a^2 + 2x^2) \sin 2\theta]} \sin \left(x^2 \sin 2\theta + \frac{a^2}{2x^2} \cos 2\theta \right) dx \\ = \pi^{1/2} e^{-a} \sin(\theta + a).$$

386. *By George Eastwood.*—"Integrate the equation

$$\frac{d^2 \phi}{dt^2} \cdot \frac{d^2 \phi}{dx^2} - \left(\frac{d\phi}{dt} \cdot \frac{d\phi}{dx} \right)^2 = 0."$$

SOLUTION BY PROF. L. G. BARBOUR.

Let $\frac{d\phi}{dt} = p$, $\frac{d\phi}{dx} = q$; then is $\frac{dp}{dt} \cdot \frac{dq}{dx} = p^2 q^2$. It is allowable and suff.
to write $\frac{dp}{dt} = p^2$, and $\frac{dq}{dx} = q^2$, $\therefore \frac{dp}{p^2} = dt$; $-\frac{1}{p} = t + c$; $d\phi = -\frac{dt}{t + c}$
 $\phi = -\log(t + c) + \log c'$, $\therefore e^\phi = c' \div (t + c) = c'' \div (x + c'')$, $\therefore x = tc_4 + c_5$.

PROBLEMS.

387. *By Prof. L. G. Barbour.*—Given the length of each side of any quadrilateral, and the distance from the middle point of any side to that of the side opposite. Required the distance from the middle point of one of the other sides to that of the side opposite.

388. *By Prof M. L. Comstock.*— F and F' being the foci of an ellipse and P a point on the curve, FD is drawn perpendicular to FP meeting $F'P$ in D . Find the locus of D : (1) when $b > c$, (2) when $b = c$, (3) when $b < c$, if b = semi-minor axis and c = distance from the centre to either focus.

389. *By Prof. W. W. Johnson.*—If three triangles have a common axis of homology when taken in pairs, the three centres of homology are in a straight line: and reciprocally if three triangles have a common centre of homology when taken in pairs, the three axes of homology pass through a common point.

390. *By Prof. W. P. Casey.*—In a triangle ABC , BD is perpendicular to the base AC , and O is the center of gravity of the triangle. Join AO , DO and CO . Given the base AC and the $\angle s AOD, AOC$, to construct the triangle ABC .

391. *By Prof. Asaph Hall.*—Given

$$\log. 91 = 1.95904 \pm r,$$

$$\log. 92 = 1.9379 \pm r,$$

find $\log. 91.5$ to five decimals, by simple proportion from the difference; and find the probable error of this logarithm.

QUERY BY PROF. H. T. EDDY. — When two determinants of the same order have the same algebraic value, show whether it is always possible to transform the one into the other by mere combinations of rows and columns; and if possible transform the two following values of $2bc \cos A - b^2 - c^2$, the one into the other:

$$\begin{vmatrix} 0, & b, & c, \\ b, & 1, & \cos A, \\ c, & \cos A, & 1, \end{vmatrix}, \quad \begin{vmatrix} 2bc \cos A, & b, & c, \\ b, & 1, & 0, \\ c, & 0, & 1, \end{vmatrix}$$

CORRECTION of "Barlow's Tables of the Squares and Cubes of Numbers", De Morgan's Edition. London. 1875. Communicated by Prof. A. HALL.

Page 42: for the square of 2059, instead of 4230481 read 4239481.

PUBLICATIONS RECEIVED.

A List of Writings on Determinants. By THOMAS MUIR, M. A., F. R. S. E. 50 pages. 8vo.

[Extracted from *The Quarterly Journal of Pure and App'd Math.* Vol. XVIII, No. 70.]

Four-place Tables. By W. BEEBE, Yale College. *A Pocket Edition.* Retail price 25 cents.

Henry H. Peck, Publisher, New Haven, Conn.

The Mathematical Magazine: A Journal of Elementary Mathematics. Edited and published

by ARTEMAS MARTIN, M. A. Erie, Pa. 16 pp. 4to. Quarterly. \$1.00 per year.

ERRATA.

In Index to Vol. VIII, line 17, for "3, 73", read 3, 137.

On page 41, line 5, for "Mr. Stockwell", read MR. STOCKWELL.